264 Relationship between the chest excursion and lung function, functional capacity and peripheral muscle strength in patients with cystic fibrosis

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Aim: Measurement of chest excursion is used to evaluate lung expansion from three different thoracic regions. The aim of the study was to investigate the relationship between chest excursion and lung function, functional capacity and upper extremity muscle strength in clinicaly stable cystic fibrosis (CF) patients.
Methods: Twenty-eight (18 males, 10 females) patients, the aged 7–21 years, with CF participated in the study. Pulmonary function test was performed using spirometry. Chest excursion was measured using a tape measure from axillar, subcostal, and epigastric regions. Functional capacity was evaluated with six-minute walk test (6MWT). Upper extremity muscle strength (shoulder flexion and abduction, elbow flexion, and hand grip strength) was evaluated using digital dynamometer.
Results: The mean FEV1 was 85.80±23.44%. Chest excursion from axillar region was significantly correlated with FVC ($r=0.61$), FEV1 ($r=0.66$), PEF ($r=0.63$), FEF25–75% ($r=0.58$), 6MWT distance ($r=0.39$), shoulder flexion ($r=0.40$) and abduction ($r=0.41$), elbow flexion ($r=0.54$), and hand grip strength ($r=0.59$, $p<0.05$). Chest excursion from epigastric region was statistically related with FVC ($r=0.59$), FEV1 ($r=0.58$), PEF ($r=0.57$), FEF25–75% ($r=0.48$), 6MWT distance ($r=0.41$), shoulder flexion ($r=0.44$) and abduction ($r=0.42$), elbow flexion ($r=0.49$), and hand grip strength ($r=0.55$, $p<0.05$). Chest excursion from subcostal region was significantly correlated with FEV1 ($r=0.39$), PEF ($r=0.38$), and FEF25–75% ($r=0.39$, $p<0.05$).
Conclusion: Chest excursion measurement from upper thorax was significantly correlated with lung function, functional capacity and upper extremity muscle strength. Increasing chest mobility was associated with increased functional capacity and upper extremity training. Therefore measurement chest mobility should be included in comprehensive evaluation of cystic fibrosis patients.

265 The development and validation of the incremental step test (IST) in children with cystic fibrosis (CF)

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Children with CF are often now as physically active as their healthy peers, so an appropriate field based exercise test in the absence of maximal exercise testing facilities is essential. The aim of the study was to develop a simple incremental externally paced step test, to assess exercise tolerance to a symptom-limited maximum. The study investigated the reproducibility and validity of the IST with the six minute walk test (6MWT) in 14 children with CF. Subjects performed both tests on two occasions in a randomised cross-over design. Measurements of pulmonary function heart rate (HR), oxygen saturations (SaO_2) and blood pressure (BP) were recorded, as well as measures of perceived exertion (visual analogue scale (VAS), OMNI scale and 15-count score). Twelve subjects (6 male) with a mean age of 10.8 years (range 7–16 years), and a mean FEV_1 83.7% predicted (range 51%-134%) completed the study. The IST demonstrated a significant and high measure of reliability ($r=0.70$, $p=0.004$), and reproducibility ($r=0.84$, $p=0.001$) and significantly correlated well with the distance achieved in the 6MWT ($r=0.74$, $p=0.006$). The IST was physically more demanding, producing a significantly higher HR ($p=0.003$), HRmax ($p=0.002$) and percent predicted HRmax ($p=0.001$). This was supported by the subjects with significantly greater VAS ($p=0.004$) and OMNI scores ($p=0.002$). The IST was able to detect a significant fall in median SaO_2 (0.5%, $p=0.034$) in these mild to moderate CF children unlike the 6MWT. This study demonstrated the IST to be reproducible, reliable and a valid functional field test of exercise tolerance in this sample of CF children.

266 Correlation between an incremental 12 minute step test and the 6 minute walk test in paediatric CF patients

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Background: The 6 minute walk test is a validated and widely used test in CF.Distances under 400 m are associated with poorer outcomes. The test needs significant space to carry out. A 12 minute incremental step test has been validated for use in children with CF [1]. The aim of the study was to investigate whether there was any correlation between the 6 minute walk test and 12 minute step test. The Pearson's Coefficient of Correlation (r) was used to measure the correlation. The end point to the step test is 312 steps. All those completing the step test were taken out of the correlation analysis. The end point for the walk test is completing the full 6 minutes and the outcome is the total distance walked. No patients had to stop or rest during the walk test.
Outcome: A total of 34 walk tests and step tests were carried out. The correlation co-efficient statistic for those not completing the step test between the two tests was 0.4 at a level of significance of 0.06. Subjects who completed the step test also performed satisfactorily on the walk test, with the minimum distance walked at 460 m and a mean of 515 m with a standard deviation of 34 m.
Conclusion: For those patients who complete the step test it can be predicted that they would also do well in the walk test. It should be noted that the number of cases in the data was small, but for those that did not complete the step test the data analysed suggests the Step test cannot be used to predict the walk test. The 12 minute incremental step test may provide useful information if the facilities for a 6 minute walk test are not available.

Reference(s)

[1] Holden, H. (2007) *The Incremental Step Test.* Nottingham University Hospitals, UK. Unpublished.

267* Differences in quality of life, lung function and hospitalisation rates for adults with cystic fibrosis, according to exercise participation

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Exercise is recommended in consensus documents regarding health care management of people with CF, however the relationship between exercise participation and health outcomes for CF adults is unclear. We aimed to compare demographics, quality of life, lung function and hospitalisation rates for CF adults, according to exercise participation. 101 (17–62 yr; 58 male; FEV_1 15–109%) adults from the RPAH CF Clinic reported their exercise participation in an un-named questionnaire when clinically stable. Participants were prospectively allocated to a high or low activity group if they performed more or less than 90 minutes of moderate/strenuous exercise per week at baseline. Quality of life was measured at baseline and at 3 months follow-up. Lung function and hospitalisation data were collected from Clinic records at baseline and at 12 months follow-up. 68 (67%) adults were allocated to the high activity and 33 (33%) to the low activity group. There were no differences in age, gender or lung function between the high and low activity groups at baseline. The high activity group had significantly higher quality of life at baseline and follow-up than the low activity group. There was no significant difference in the change in FEV_1 from baseline to follow-up between the two groups, however females in the low activity group had more than six times greater annual decline in FEV_1 than their high activity female peers. The high activity group had significantly fewer days in hospital during the 12 month follow-up than the low activity group. This result was independent of baseline FEV_1. Exercise has the potential to improve quality of life and reduce hospitalisation rates for CF adults.